

SECTION V – B CONSERVATION EFFECTS

2. Effects of Resource Management Systems

Introduction

This section describes the effects of **Resource Management Systems (RMS)** on the soil, water, air, plant, and animal (SWAPA) resources and their associated social, economic, and cultural considerations.

For each example RMS in this section, effects are displayed for the resource problems or concerns that were previously identified for each example in Section III-A-2 of the FOTG. Please note that these examples are representative of typical situations in Maryland, but do not include all possible site-specific conditions.

Examples are organized according to the following land uses:

[Cropland](#)

[Hayland](#)

[Pasture](#)

[Woodland](#)

[Wildlife Land](#)

[Headquarters](#)

Resource Management Systems (RMS) for Cropland

Example 1: Highly erodible cropland fields with classic gully erosion occurring in two areas. The cropping system is continuous corn, conventionally tilled. Fertilizer is applied based on perceived crop needs, without using soil tests to determine soil nutrient levels. A significant amount of Johnsongrass (a noxious weed) is in several areas.

Typical RMS:

328 – Conservation Crop Rotation
 329A – Residue Management: No Till, Strip Till
 340 – Cover Crop
 412 – Grassed Waterway
 393 – Filter Strip
 590 – Nutrient Management
 595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill Classic gully Soil deposition	Beneficial: Erosion and deposition are reduced.
WATER	Quantity	None identified	None identified
	Quality	Sediment Nutrients	Beneficial: Sediment delivery to surface water is reduced. Nutrients entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Pests (noxious weeds)	Beneficial: Pest management is improved.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Installation costs are outweighed by long-term cost-effectiveness and reduced labor and equipment requirements.
Cultural Resources	None identified	None identified

RMS for Cropland (continued)

Example 2: Cropland field is relatively flat. A corn-soybean rotation is used. Some areas of the field are poorly drained and adversely affect crop production. During wet seasons, equipment tends to bog down in poorly drained soils. Fertilizer is applied based on perceived crop needs, without using soil tests to determine soil nutrient levels. Pesticide leaching is a concern due to high water tables. Soil texture is predominantly sandy loam.

Typical RMS:

328 – Conservation Crop Rotation
344 – Residue Management, Seasonal
590 – Nutrient Management
606 – Subsurface Drainage
595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion and deposition are reduced.
WATER	Quantity	Excess subsurface water	Beneficial: High water tables are reduced.
	Quality	Sediment	Beneficial: Sediment in surface waters is reduced due to increased infiltration and less surface runoff.
		Nutrients Pesticides	Neutral: Subsurface drainage can increase surface water contamination by nutrients, pesticides, and other soil contaminants. Implementing nutrient management and pest management should offset this.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Suitability	Beneficial: Site conditions are improved to support the desired crops.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Installation costs are outweighed by long-term cost-effectiveness and reduced labor and equipment requirements.
Cultural Resources	None identified	None identified

RMS for Cropland (continued)

Example 3: Highly erodible cropland fields with ephemeral gullies in some areas. Plants are stunted and stressed where erosion is severe. The cropping system is grain corn, conventionally tilled, with hay in the rotation. Fertilizer is applied based on perceived crop needs, without using soil tests to determine soil nutrient levels. No pest problems or pesticide concerns were noted. In one field, prehistoric artifacts were observed at the top of the slope.

Typical RMS:

328 – Conservation Crop Rotation
329A – Residue Management, No-Till and Strip Till
362 – Diversion
412 – Grassed Waterway
585 – Contour Stripcropping
590 – Nutrient Management
595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill Ephemeral gully Soil deposition	Beneficial: Erosion and deposition are reduced.
WATER	Quantity	None identified	None identified
	Quality	Sediment Nutrients	Beneficial: Sediment delivery to surface water is reduced. Nutrients entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Suitability Establishment and Management	Beneficial: Steep, low productivity sites are planted to perennial grasses that are better adapted to site conditions. In other highly erodible areas, plant residues are managed to improve site conditions for crop growth.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Installation costs are outweighed by long-term cost-effectiveness and reduced labor requirements.
Cultural Resources	Degradation or damage of resources	Beneficial: Erosion is reduced and cultural resources are protected in place. (Note: Cultural resources are avoided during installation of the diversion and waterway.)

Resource Management System (RMS) for Hayland

Example : Continuous cool-season grass hay field. The stand is thinning and productivity is low. Soil test results indicate high levels of phosphorus in the soil.

Typical RMS:

512 – Pasture and Hay Planting
 511 – Forage Harvest Management
 590 – Nutrient Management
 393 – Filter Strip

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion and off-site sediment movement are reduced.
WATER	Quality	Sediment Nutrients	Beneficial: Sediment delivery to surface water is reduced. Nutrients entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Nutrients	Beneficial: Nutrient management is improved; plant productivity is increased.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness	Beneficial: Installation costs are outweighed by improved hayland productivity.
Cultural Resources	None identified	None identified

Resource Management Systems (RMS) for Pasture

Example 1: Overgrazed cool-season grass pasture with weedy patches and bare soil in some areas. Livestock have a sufficient water supply and are fenced out of streams.

Typical RMS:

512 – Pasture and Hay Planting
 528A – Prescribed Grazing
 595 – Pest Management
 590 – Nutrient Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quantity	None identified	None identified
	Quality	Sediment Nutrients	Beneficial: Sediment delivery to surface water is reduced. Nutrients entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Nutrients Pests (weeds)	Beneficial: Nutrient management is improved. Weeds are adequately controlled.
ANIMALS	Health and Productivity	Food	Beneficial: Pasture is managed to provide improved forage for livestock.

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness	Beneficial: Installation costs are outweighed by improved forage and livestock productivity.
Cultural Resources	None identified	None identified

RMS for Pasture (continued)

Example 2: Cool-season grass-legume pasture. Some areas of the pasture are heavily grazed and weedy, but cover is generally good. Livestock have unrestricted access to a trout stream, resulting in extensive bank erosion and impaired water quality for fish. In-stream water quality tests indicate high levels of fecal coliform bacteria.

Typical RMS:

528A – Prescribed Grazing
595 – Pest Management
590 – Nutrient Management
382 – Fence
574 – Spring Development
614 – Trough
561 – Heavy Use Area Protection
728 – Stream Crossing

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quantity	Insufficient water supply	Beneficial: Water is provided in the pasture to meet livestock needs.
	Quality	Sediment Nutrients and organics Pathogens Aquatic habitat suitability	Beneficial: Sediment delivery to surface water is reduced. Nutrients and organics entering surface and groundwater are reduced. Pathogens are reduced. Aquatic habitat is improved.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Nutrients Pests (weeds)	Beneficial: Nutrient management is improved. Weeds are adequately controlled.
ANIMALS	Health and Productivity (Livestock)	Food Water	Beneficial: Pasture is managed to provide improved forage and an improved water supply for livestock.
	Health and Productivity (Fish)	Water	Beneficial: Improved aquatic habitat for fish because livestock are excluded from the stream and the pasture is better managed.

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Installation costs and higher maintenance costs are outweighed by improved forage and livestock productivity.
Cultural Resources	None identified	None identified

Resource Management Systems (RMS) for Woodland

Example 1: An existing woodlot has not been managed. Some valuable trees are present, but there are also invasive species in some areas. No erosion problems or other resource concerns were noted.

Typical RMS:

666 – Forest Stand Improvement

595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	None identified	None identified
WATER	None identified	None identified	None identified
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Establishment and management Pests (invasive species)	Beneficial: Invasive species are controlled. Growth of desirable species is improved.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Implementation costs are outweighed by improved woodland productivity.
Cultural Resources	None identified	None identified

RMS for Woodland (continued)

Example 2: A highly erodible cropland field will be planted and managed for Christmas tree production.

Typical RMS:

612 – Tree Planting
327 – Conservation Cover (*establish grass between the rows*)
590 – Nutrient Management
595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quality	Sediment Nutrients	Beneficial: Sediment delivery to surface water is reduced. Nutrients entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Pests (insects and weeds)	Beneficial: Pests are adequately controlled.
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Implementation costs are outweighed by long-term productivity.
Cultural Resources	None identified	N/A

Resource Management Systems (RMS) for Wildlife Land

Example 1: Area is a 3-acre lawn consisting of frequently mowed cool-season grasses. Landowner wants to establish and maintain native warm-season grasses and wildflowers for upland wildlife habitat. Existing turf is dense and is fertilized several times during the growing season based on turf color. No soil tests have been used to determine soil nutrient levels. Insecticides are periodically applied for "preventive" purposes, regardless of whether or not insect pests are actually present.

Typical RMS:

327 – Conservation Cover
 590 – Nutrient Management
 595 – Pest Management
 645 – Upland Wildlife Habitat Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	None identified	None identified	None identified
WATER	Quality	Nutrients Pesticides	Beneficial: Nutrients and pesticides entering surface and groundwater are reduced.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Pests (weeds)	Beneficial: Undesirable competitive weeds are adequately controlled, especially during establishment of the desired species.
ANIMALS	Health and Productivity	Food and cover	Beneficial: Food and cover are increased.

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Neutral: Establishment costs are offset by long-term reduced maintenance costs.
Cultural Resources	None identified	None identified

RMS for Wildlife Land (continued)

Example 2: A small field of continuous soybeans is gently sloping to a low area at one end of the field. The landowner wants to convert the entire field into a shallow water area (with herbaceous buffer) to provide wetland wildlife habitat. A site investigation revealed the presence of prehistoric artifacts at the high end of the field.

Typical RMS:

646 – Shallow Water Area for Wildlife

644 – Wetland Wildlife Habitat Management

595 – Pest Management

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quality	Nutrients and organics	Detrimental: High populations of waterfowl may increase nutrients and organics in surface waters.
AIR	None identified	None identified	None identified
PLANTS	Health and Productivity	Pests (weeds)	Beneficial: Undesirable competitive weeds are adequately controlled, especially during establishment of the desired species.
ANIMALS	Health and Productivity	Food, cover, and water	Beneficial: Food, cover, and water are increased.

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Detrimental: Installation and maintenance costs may be higher than when the field was in an agricultural use.
Cultural Resources	Degradation or damage of resources	Beneficial: Erosion is reduced and cultural resources are protected in place. (Note: Cultural resources are avoided during installation of the shallow water area.)

Resource Management Systems (RMS) for Headquarters

Example 1: Headquarters at a poultry operation consists of three chicken houses, with the landowner's house nearby. Adjacent neighbors have complained about particulates blown by tunnel fans, and excessive odors. Dead poultry are placed in open area behind the houses, and are usually buried a few days later. Manure/litter from house cleanout is stacked on bare ground where soils have a seasonal high water table. It is periodically hauled off-site for use elsewhere.

Typical RMS:

561 - Heavy Use Area Protection
 313 - Waste Storage Structure
 317 - Composting Facility
 590 - Nutrient Management
 633 - Waste Utilization
 380 – Windbreak/Shelterbelt Establishment

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quantity	None identified	None identified
	Quality	Nutrients and organics Pathogens	Beneficial: Nutrients entering surface and groundwater are reduced. Pathogens from disposal of dead poultry are eliminated.
AIR	Quality	Airborne particulates Airborne odors	Beneficial: Particulates from tunnel fans are controlled. Odors are reduced.
PLANTS	None identified	None identified	None identified
ANIMALS	None identified	None identified	None identified

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Quality of life for neighbors Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Particulates and odors are reduced in the neighboring community. Installation costs are outweighed by improved efficiency in handling manure and dead birds.
Cultural Resources	None identified	None identified

RMS for Headquarters (continued)

Example 2: Headquarters at a dairy operation that is milking 200 head. Livestock walkways and loafing areas are very muddy in wet weather, and it is difficult to remove accumulated manure. A significant amount of time is spent preparing cows for milking. Although livestock are fenced out of a stream adjacent to the loafing area, it is heavily contaminated with manure runoff from the barnyard. Manure is hauled and spread frequently, usually on a daily basis. Neighbors have complained about odors.

Typical RMS:

561 – Heavy Use Area Protection
313 – Waste Storage Structure
558 – Roof Runoff Structure
635 – Wastewater Treatment Strip
590 – Nutrient Management
633 – Waste Utilization

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quantity	None identified	None identified
	Quality	Nutrients and organics Pathogens	Beneficial: Nutrients and organics entering surface and groundwater are reduced. Pathogens are reduced.
AIR	Quality	Airborne odors	Beneficial: Odors are controlled.
PLANTS	None identified	None identified	None identified
ANIMALS	Health and Productivity	Growth, reproduction, and condition	Beneficial: Livestock health is improved by better management of the headquarters area.

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Quality of life for neighbors Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Odors are reduced in the neighboring community. Installation costs are outweighed by improved livestock health and productivity.
Cultural Resources	None identified	None identified

RMS for Headquarters (continued)

Example 3: Farmstead with no livestock. Heavily used areas around the house and equipment sheds were previously planted to grass, but cover is now sparse and some erosion is occurring. The farm lane is rough and uneven in some spots. Access is difficult in wet weather.

Typical RMS:

342 – Critical Area Planting

560 – Access Road

The following table lists the effects that this RMS is likely to have on natural resource concerns that have been identified for this planning unit. In addition to effects on specific natural resources, this evaluation also includes effects of the RMS on socio-economic concerns and cultural resources.

RESOURCE	RESOURCE CONSIDERATION	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
SOIL	Erosion	Sheet and rill	Beneficial: Erosion is reduced.
WATER	Quantity	None identified	None identified
	Quality	Sediment	Beneficial: Sediment delivery to surface waters is reduced.
AIR	None identified	N/A	N/A
PLANTS	Health and Productivity	Suitability	Beneficial: Bare areas are planted to perennial grasses that are better adapted to site conditions.
ANIMALS	None identified	N/A	N/A

OTHER CONSIDERATIONS	CONCERNS/PROBLEMS	EFFECTS OF THE RMS
Social and Economic Concerns	Cost and cost-effectiveness Availability of skills, labor, and equipment	Beneficial: Installation costs are outweighed by an improved all-weather access road that needs less maintenance.
Cultural Resources	None identified	None identified